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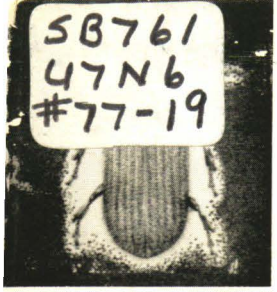

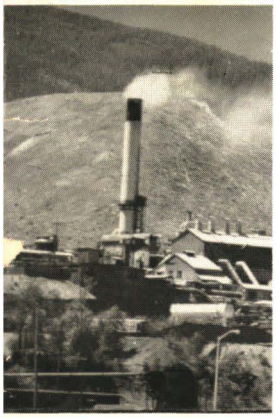

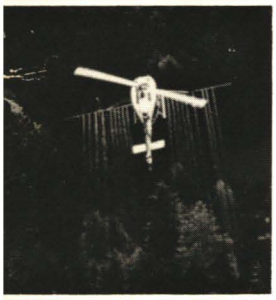

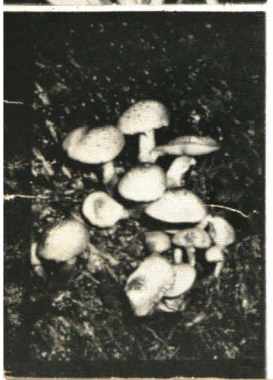

FOREST INSECT & DISEASE MANAGEMENT

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State & Private Forestry · Missoula, MT 59801

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SURVEY OF INSECT AND DISEASE CONDITIONS IN FORESTS AND SHELTERBELTS NORTH DAKOTA 1977

by

T. H. Flavell, S. Tunnock, and L. E. Drake

ABSTRACT

Aerial and ground surveys to detect and evaluate forest insect and disease conditions in North Dakota were made during June 1977 by personnel from the U.S. Forest Service, Forest Insect and Disease Management staff and the Rocky Mountain Forest and Range Experiment Station.

A forest tent caterpillar outbreak in the Turtle Mountains was estimated to cover 195,000 acres in this popular vacation area. Siberian elm shelterbelts throughout the state were heavily defoliated by the spring and fall cankerworms. Cottonwood trees along the Missouri River near Bismarck were dying from a combination of soil compaction and possible nitrogen poisoning in cattle feedlots. Dutch elm disease was evident in six American elm trees near Lisbon.

INTRODUCTION

North Dakota is noted for wind and wheat, not trees. But trees are an important asset to both the quality of life and resource conservation in the state. Protecting them from insects and diseases is perhaps made more important because of their relative scarcity. A survey and evaluation of insect and disease conditions affecting trees in North Dakota were made June 13-24, 1977, by personnel from the U.S. Forest Service, Region 1, State and Private Forestry, Forest insect and Disease Management, accompanied by personnel from the North Dakota Forestry Department; U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station; and North Dakota State University at Fargo.

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ROCKY MOUNTAIN STATION

The dust bowl of the 1930's was a tragic demonstration of the need for soil conservation. One result was the establishment of the U.S. Forest Service Prairie States Forestry Project in 1934. By 1975 an estimated 255,822 acres of trees had been planted as farmstead windbarriers and some 46,000 miles of field shelterbelts in North Dakota. Today, North Dakotans plant an average of 8 million trees per year as new windbarriers or to rehabilitate old ones. Despite this seemingly large number of trees, the number of windbarrier plantings has been declining since the early 1960's. Some shelterbelts are even being removed to increase land available for cash crops or to make way for new irrigation systems. Alarmed over the possible long-term consequences of shelterbelt removal, the General Accounting Office (the investigative arm of the U.S. Congress) looked into the causes and the need for action to discourage this trend. Among the many factors identified as contributing to the problem were "diseases, age, crop sprays, and poor maintenance."[1/] Used in this sense, "diseases" should include insects as well as microbial pathogens. Unless the trend toward belt removal is reversed, it is feared that the prairie states may again be subjected to "dust bowl" conditions.

In addition to windbarrier plantings, North Dakota has an estimated 421,000 acres of elm-ash-cottonwood forest type. The Turtle Mountains in the north-central section of the state are rapidly becoming a center for outdoor recreation. Summer homes line the shores of the region's numerous pothole lakes. Hardwood stands along the Red River of the North and Missouri River protect the banks from erosion and offer unique recreational opportunities.

Trees clearly have an important role to play in North Dakota. Careful propagation and protection from damaging insects and diseases are essential for the continued enjoyment of the many benefits trees afford.

METHODS

An aerial survey to detect insect and disease damaged trees in forests and shelterbelts was made June 13, 1977. Observations were made from a Cessna 182 flying 500 feet above the terrain at 90-100 m.p.h. A systematic survey was made over the Turtle Mountains using east-west flight lines 2 miles apart to map defoliated areas. Major river drainages and wildlife management areas were flown in a systematic manner giving 100 percent coverage. Shelterbelts were observed during the course of flying to and from forested areas and river systems.

Areas of defoliation and/or tree mortality were checked on the ground during the week of June 24.

1/ Goldsmith, L. Action needed to discourage removal of trees that shelter cropland in the Great Plains. In Proceedings of the symposium: Shelterbelts on the Great Plains, Denver, Colo. April 20-22, 1976. Edited by Richard W. Tinus.

RESULTS

Turtle Mountains: Defoliation of aspen, *Populus tremuloides* Michx., by the forest tent caterpillar, *Malacosoma disstria* (Hbn.), occurred on about 195,000 acres in the Turtle Mountains (Fig. 1). Moderate to heavy defoliation was concentrated around Lake Metigoshe (Fig. 2 and 3), south of the Robb Lake National Wildlife Refuge, in the southern portion of the Wakapa State Game Management Area and in the School Section Lake National Wildlife Refuge. Light defoliation occurred over most of the area except for the western edge of the mountains. Ground checks showed heavy forest tent caterpillar pupal populations in the understory. Examination of some pupae in the Lake Metigoshe area revealed high rates of parasitism mostly by a fly, probably *Sarcophaga aldrichi* Park.

Missouri River near Bismarck: Numerous dead cottonwood, *Populus deltoides* var. *occidentalis* Rydb., and others with severe branch dieback were observed along the Missouri River 10 miles north and south of Bismarck. Examination on the ground showed that mortality was occurring in cattle feedlot operations. Soil compaction, possible nitrogen poisoning, and age were considered responsible.

Lisbon District, North Dakota Forest Service: Several spots (from 2 to 14 acres) of American elms, *Ulmus americana* L., were heavily defoliated by cankerworms, *Paleacrita vernata* (Peck) and *Alsophila pometaria* (Harr.), along the Cheyenne River from Valley City south to Lisbon.

One clump of six mature American elms were dying from Dutch elm disease (caused by *Ceratocystis ulmi* (Buisman) C. Moreau) about 10 miles west of Lisbon. Tree killing by this disease will probably continue to increase throughout North Dakota, especially in the eastern sector where elms are more prevalent.

Complete defoliation of many Siberian elm, *Ulmus pumila* L., shelterbelts by cankerworms was common in the Lisbon District.

Cankerworm damage is expected to be a chronic problem in the forests and shelterbelts of North Dakota.

Walhalla District, North Dakota Forest Service: Most of the forested lands on this District are found along the Pembina and Tongue River drainages. No major insect damage was detected within these forests.

Siberian elm shelterbelts completely defoliated by cankerworms were numerous in this northeast portion of the state. A few examined were dead.

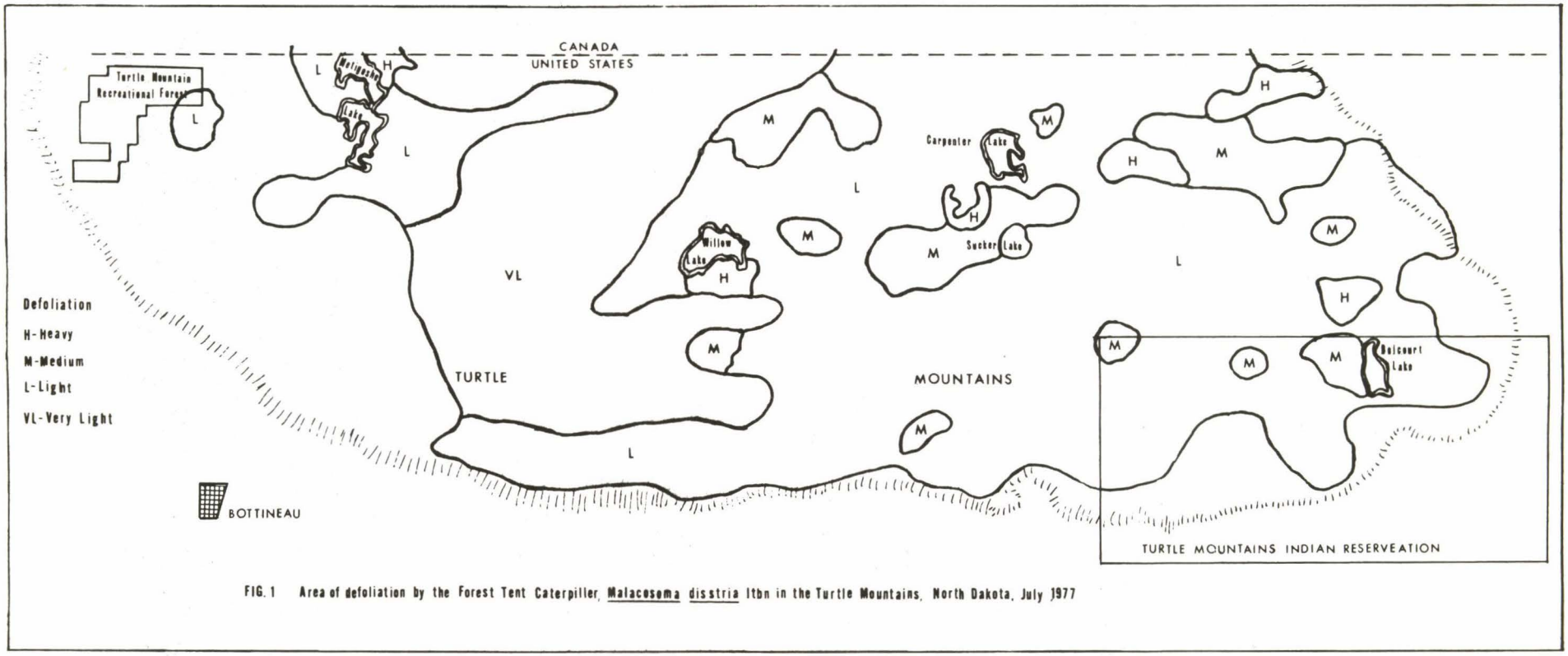

FIG. 1 Area of defoliation by the Forest Tent Caterpiller, Malacosoma disstria Ithn in the Turtle Mountains, North Dakota, July 1977

Figure 2.--Aspen stand in Turtle Mountains defoliated by the forest tent caterpillar.

Figure 3.--Defoliation of aspen by the forest tent caterpillar around Lake Metigoshe, North Dakota.

Field shelterbelts: Heavy defoliation of Siberian elm by fall cankerworms was evident throughout the state (Fig. 4). In many belts the combination of defoliation by the cankerworms followed by herbicide damage from crop spraying has resulted in severe branch dieback and considerable tree mortality.

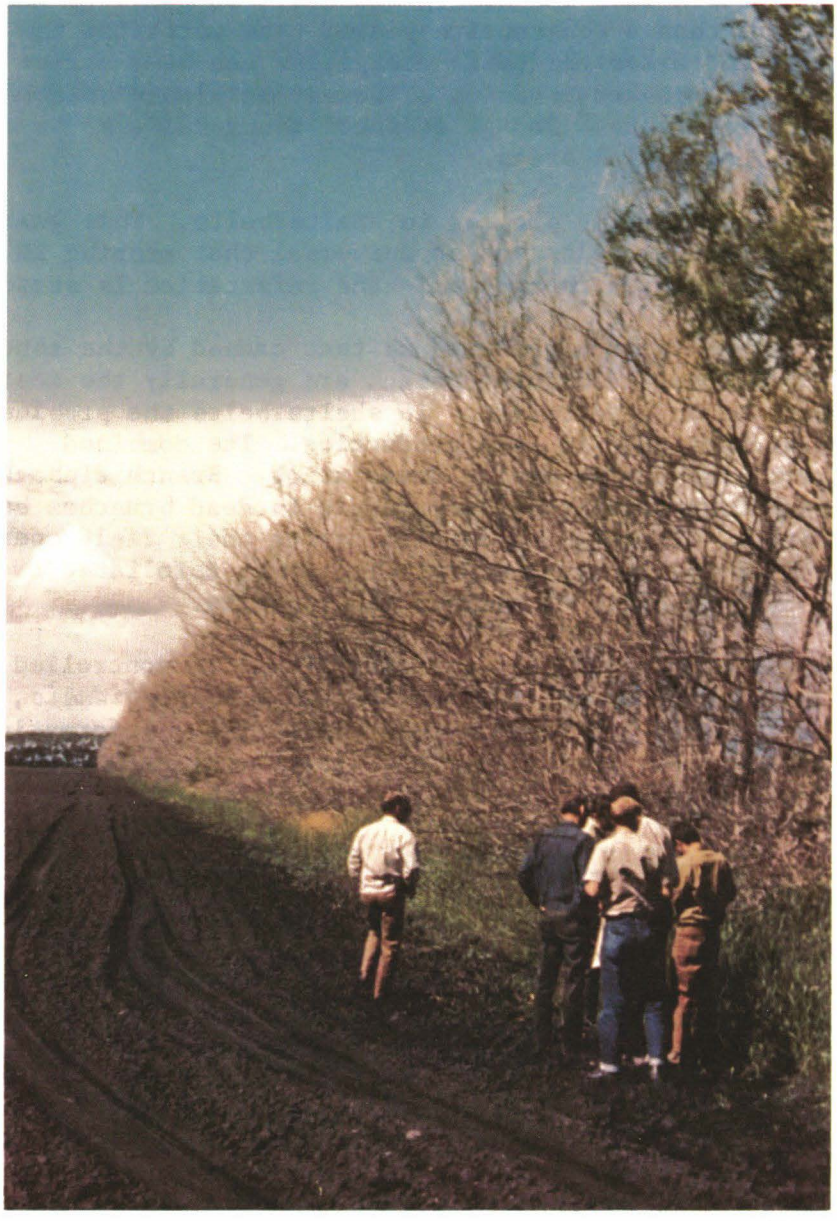

Figure 4.--Siberian elm shelterbelt defoliated by cankerworms.

DISCUSSION

The forest tent caterpillar and cankerworms are epidemic in North Dakota. This is the second consecutive year of noticeable defoliation by the forest tent caterpillar in the Turtle Mountains. On the average, outbreaks of this pest last for 3 to 6 years. Damage to host trees is usually limited to growth loss and branch dieback. If complete defoliation occurs for more than 4 consecutive years, tree mortality is expected. In populated areas the tent caterpillar can be a serious nuisance. Their droppings and invasion of homes and picnic sites make life unpleasant for residents. Damage to shade trees can also be a serious problem in residential areas.

Cankerworms have been a chronic problem in shelterbelts. This year the infestation of Siberian elm belts was so universal that mapping in areas of defoliation was considered impractical--the infestation is statewide.

Damage from this insect is much the same as that caused by the tent caterpillar. Growth loss and branch dieback are generally the most serious consequence of an infestation. In shelterbelts the problem is compounded by herbicides used in crop production. The combined cankerworm and herbicide damage can be devastating. Branch dieback, in addition to weakening belt trees, may result in dead branches being scattered over fields. These annoy farmers during their field operations and may contribute to belt removal. And, of course, defoliated trees do not offer the many benefits of healthy shelterbelts.

Both the cankerworms and forest tent caterpillar can be controlled with insecticides. The biological insecticide, *Bacillus thuringiensis*, is registered for these pests and is reasonably effective. Information on this and other insecticides can be obtained from county agents and the North Dakota Forest Service.

PESTICIDE PRECAUTIONARY STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of the reach of children and animals--and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

REFERENCE

Hildahl, F., and A. E. Campbell. 1975. Forest tent caterpillar in the prairie provinces. Northern Forest Research Centre, Edmonton, Alberta, Canada. Information Report NOR-X-135.